Missouri Department of Natural Resources

Total Maximum Daily Load Information Sheet

Monroe City Route J Lake

Waterbody Segment at a Glance:

County: Ralls
Nearby Cities: Monroe City
Area of impairment: 178 acres
Pollutant 1: Atrazine
Source 1: Corn, sorghum production
Pollutant 2: Cyanazine
Source 2: Corn, sorghum production

State map showing location of watershed

TMDL Priority Ranking: Medium

Description of the Problem

Beneficial uses of Monroe City Rte J Lake:

- Livestock and Wildlife Watering
- Protection of Warm Water Aquatic Life and Human Health associated with Fish Consumption
- Boating and Canoeing
- Drinking Water Supply
- Whole Body Contact

Use that is impaired:

- Drinking Water Supply

Standards that apply

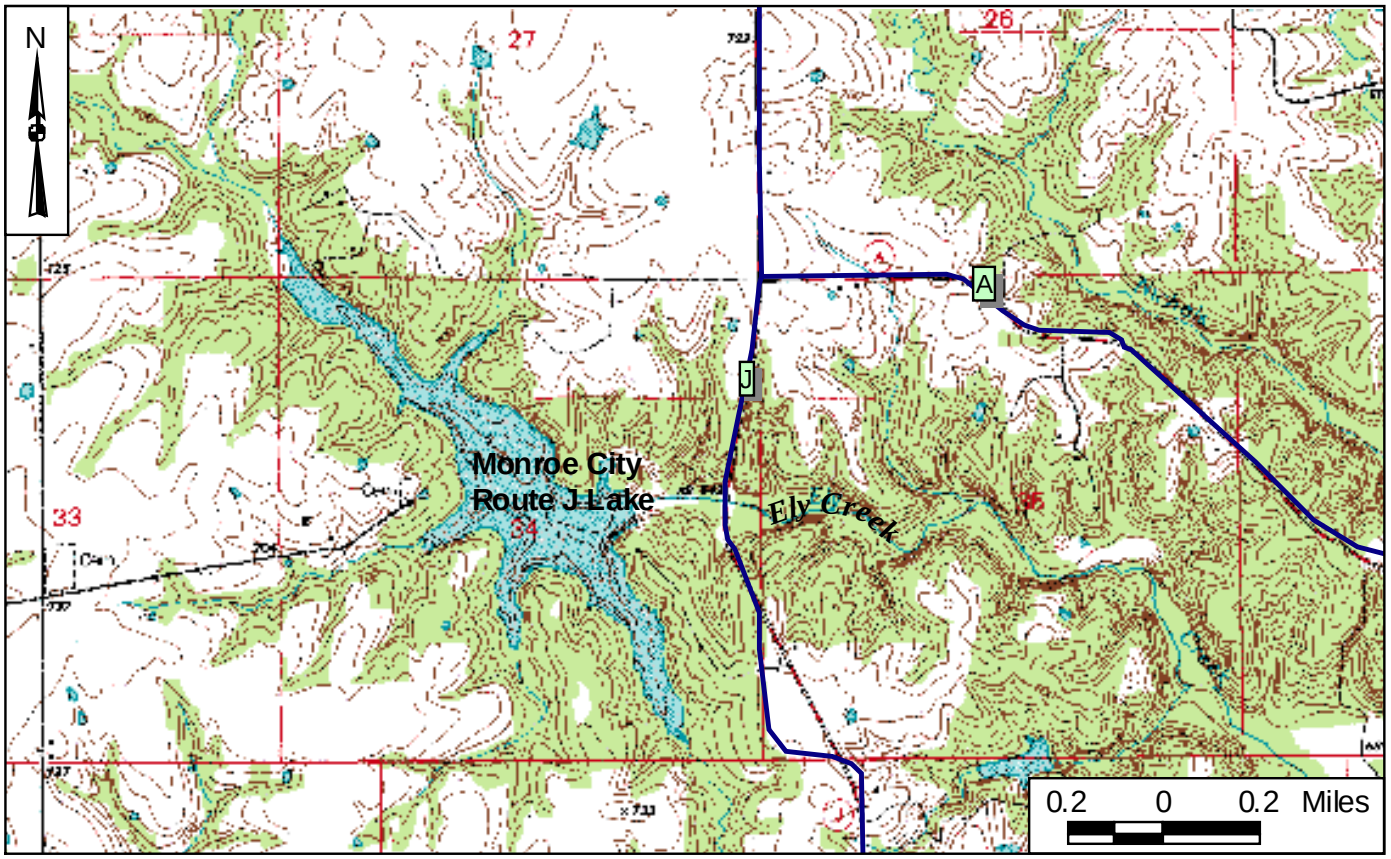
- The impairment of this lake is based on exceedence of the specific criterion of 3 micrograms per liter (µg/L or parts per billion) atrazine, as an average of the period of record, contained in Missouri's Water Quality Standards. 10 CSR 20-7.031 Table A.
- The impairment of this lake is based on exceedence of the federal health advisory level of 1 µg/L cyanazine.

The Route J Lake is the largest of two lakes that are the drinking water supply of the 1,200 people in Monroe City. The watershed, encompassing approximately 5,000 acres, is primarily agricultural with 65 percent cropland, 16 percent grassland, 17 percent forest, and 2 percent water. Monroe City also supplies three rural water districts. The lake has a history of elevated levels of atrazine and cyanazine, two agricultural herbicides commonly used in Missouri on corn and grain sorghum for

broadleaf weed control. Cyanazine was used from 1971 to 1999, when its manufacturer voluntarily withdrew it from production. At one time it was the fourth most widely used synthetic chemical pesticide in U.S. agriculture. It has been identified as a surface water contaminant in 30 states, including Missouri. Cyanazine was withdrawn from use after being linked to a range of adverse health effects, including respiratory distress, cerebral palsy, cancer, and impaired fetal development.

Since 1993, the allowable uses for atrazine have been restricted, but it continues to be widely used in Missouri. Atrazine is considered a possible human carcinogen, so the state standard is set at the very low level of three micrograms per liter (µg/L) or parts per billion. In recent years, concentrations of atrazine and cyanazine have been found to frequently exceed state and federal drinking water standards. The state drinking water standard for atrazine is 3 µg/L and the federally recommended limit for cyanazine is 1µg/L. The present long-term average atrazine level in the lake is 3.57 µg/L and the long term average cyanazine level is 2.23 µg/L. Finished drinking water produced by Monroe City has a long term average levels of 0.77 ug/L for atrazine and 0.31 µg/L for cyanazine. The Department of Natural Resources will continue to monitor herbicide levels in the Route J lake. The following information contains a map of the lake area and tables that summarize the existing data.

Map of Monroe City Route J Lake, Ralls County



Yearly Atrazine Levels in Monroe City Route J Lake, 1995-1999
(µg/L)

Year (Months)	Average	Range
1995 (1-12)	1.39	0.3-2.6
1996 (1-11)	8.35	1.7-15
1997 (1-11)	5.28	2.1-12
1998 (1-12)	2.53	0.3-6.4
1999 (1-12)	1.86	0.5-3.8

Source: Novartis Inc.

Monthly Atrazine Levels in Monroe City Route J Lake, 1995-1999
(µg/L)

Month (Years)	Average	Range
January (1995-1999)	4.36	2.2-12
February (1995-1999)	3.67	0.55-12
March (1995-1999)	2.18	1-3.8
April (1995-1999)	1.8	0.9-4
May (1995-1999)	2.98	0.3-11
June (1995-1999)	3.8	0.2-15
July (1995-1999)	4.44	0.3-14
August (1995-1999)	5.18	1.6-12
September (1995-1999)	5.9	2.3-13
October (1995-1999)	5.62	1.6-14
November (1995-1999)	3.06	1.9-5
December (1995, 1998-1999)	1.47	1.4-1.6

Source: Novartis Inc.

Yearly Atrazine and Cyanazine Levels in Monroe City Route J Lake, 1993-1997
(µg/L)

Year (Months)	Atrazine Average	Atrazine Range	Cyanazine Average	Cyanazine Range
1993 (6,7,8,12)	1.39	0.4-2.5	0	0-0
1994 (3,7,8,12)	5.9	0-20	6.39	0-9.9
1995 (3,4,6,8,10)	0.86	0-1.16	0	0-0
1996 (4,6,7,8,10,12)	7.88	0.91-13.2	7.76	0.64-19.65
1997 (4,6)	1.74	1.42-2.12	1.89	1.26-2.48

Source: USDA Natural Resource Conservation Service

Monthly Atrazine and Cyanazine Levels in Monroe City Route J Lake, 1993-1997 (µg/L)

Month (Years)	Atrazine Average	Atrazine Range	Cyanazine Average	Cyanazine Range
March (1994-1995)	0.47	0-0.83	0.09	0-0.26
April (1995-1997)	0.78	0-1.42	0.63	0-1.26
June (1993,1995-1997)	2.89	0.98-9.08	1.42	0-4.13
July (1993-1994, 1996)	10.1	2.5-20	5.13	0-9.9
August (1993-1996)	3.01	0.54-8.9	2.88	0-9
October (1996-1997)	6.8	1.3-12.3	9.83	0-19.65
December (1993-1994, 1996)	4.53	0.4-13.2	3.83	0-11.5

Source: USDA Natural Resource Conservation Service

Atrazine and Cyanazine in Monroe City Route J Lake, 1999-2000 (µg/L)

Month, Year	**Atrazine**	**Cyanazine**
December, 1999	1.74	0
March, 2000	1.23	0
June, 2000	1.67	0
September, 2000	1.25	0

Source: Missouri Dept of Natural Resources

For more information call or write:
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